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No. 3

ON SOME OF OUR COMMON INSECTS.

III. CABBAGE BUTTERFLIES.

BY THE EDITOR.

The next species of *Pieris* on our list—the Rape Butterfly (*P. rapæ*, Linn.,) though an European insect, is rapidly becoming one of our commonest and most destructive species, especially in the Eastern portion of the Dominion. The history of its arrival near Quebec in some ocean steamship, its discovery by Mr. Couper in 1859, its capture in abundance at Quebec by Mr. Bowles, in 1863, and its subsequent rapid spread in all directions is probably well known to all our readers. It is needless, then, for us to dwell upon it here; we may merely state further that it had reached the city of New York in 1869, Halifax, N. S., in 1871, and last year it had come as far west as Belleville and Trenton, Ont. We fully expect to see it at Port Hope this year!

The Rape Butterfly, like the preceding species, is white, with a black dash at the tip of the forewings, a black spot on the front margin of the

Fig. 8.

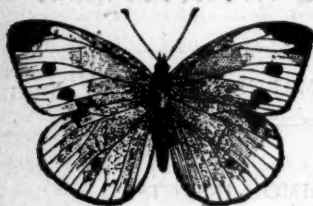


hind wings, and in the male (Fig. 8) one black spot in the middle of the forewings, but in the female (Fig. 9) two. The under surface of the forewings, in both sexes, is marked by two spots, corresponding to those on the upper surface in the female; in other respects the wings

are much alike on both sides, except that beneath there is a tint of yellow at base and tip. Occasionally male specimens are found of a bright yellow colour, like our common Sulphur-yellow Butterfly (*Colias philodice*); to

this variety, which does not occur at all in Europe, Mr. Scudder has given

Fig. 9.



the name of *Novangliae*, from the first observed specimens having been found in the New England States. Dr. Fitch gives it as his opinion that this colour is produced by seclusion from light (13th Report, p. 559), but we should think it much more probably caused by peculiarity of food. Mr. Caulfield,

of Montreal, (C. E., iv., p. 203,) is stated indeed to have found the yellow colour displayed when the larvae had been fed upon mignonette. We must await fuller observations, however, before we can feel justified in adopting any particular theory upon the subject.

The larva (Fig. 10, a) of this Butterfly is, when full grown, of a pale green colour, finely dotted with black, with a yellowish dorsal stripe, and a series of small yellow spots forming a stripe along each side; its length is about an inch and a quarter. It feeds, like *P. oleracea*, upon various species of cruciferous plants, especially upon the cabbage, to which it is most destructive. In this case it bores down, when feeding, into the very heart of the plant and thus renders the vegetable quite unfit for food. It forms its chrysalis (Fig. 10, b) in the same kinds of situations and in a similar manner to the preceding species. In this state it remains, in summer, for from a week to a fortnight, but in the autumn it continues as a pupa until the following spring. There are at least two, perhaps three, broods in the year.

Fig. 10.

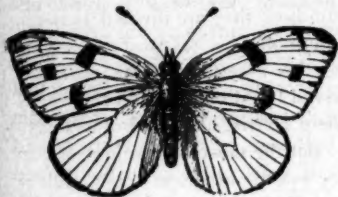
The ravages of this insect in Northern America are beginning to be somewhat checked by a parasite (*Pteromalus puparum*, Linn.); it belongs to the ichneumon family, and is a four-winged fly, about one-eighth of an inch long, with a golden-hued body and a bright green head.

The remaining species of *Pieris* found in Canada—the Southern Cabbage Butterfly (*Pieris protodice*, Bois.)—is quite a rarity with us, though oftentimes very abundant in the western and more southern States. Last August we found it to be the commonest butterfly about Chicago and through the States of Illinois and Iowa. Like the other two species, it is white with black markings; the accompanying illustrations so well represent the butterfly



that we need not occupy our space with any special description. (Fig.

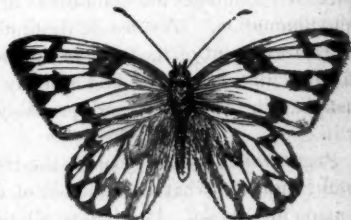
Fig. 11.



11, with the comparatively few black spots, represents the male. Fig. 12, the female, with its much more numerous and conspicuous spots and markings.)

The chrysalis (Fig. 13, *b*) is over half an inch in length, of a light bluish-gray color, more or less profusely speckled with black, with the projecting portions tinted with pale yellow or flesh color, and marked with large black dots. The caterpillar

Fig. 12.



(Fig. 13, *a*) varies in colour from deep to pale bluish and green; it has four longitudinal yellow stripes, and is thickly covered with black dots. As in the other species there are two broods in the year, and the winter is passed in the pupa state. In the Southern States it is a very injurious insect, but here it

Fig. 13.



is too rare to be more than an interesting curiosity.

Another species of *Pieris* (*P. frigida*, Scudder) has been taken in Labrador and on the Island of Anticosti, but it is not likely ever to spread much, or to be ranked amongst 'common insects.'

ON THE GEOGRAPHICAL DISTRIBUTION OF SOME GENERA OF CANADIAN INSECTS.

BY FRANCIS WALKER, LONDON, ENGLAND.

ISOSOMA.—So much has been lately written about this genus that it may be dismissed with a few words. The *Eurytomidae*, to which it belongs, were considered by Nees to be in a debatable state between the

Chalcidiae and the *Cynips* tribe, and though they are now fixed with the *Chalcidiae*, there is still matter for argument as to their maintenance by animal life, or by vegetable life, or as to how they are divided between these two means of existence. Nees mentions his discovery of a gall-making *Eurytoma*, and Girand announces his ascertaining the vegetable food of *Isosoma*, a fact afterwards observed by Moncreaff, but this genus has more importance in the U. States, where Harris, Fitch and others have been witnesses of its ravages on corn. But the most interesting part of its history is in Canada where a species occurs in grape seeds, and is remarkable not only on account of the singularity of its abode, but also by the contrariety of the sexes, one of them representing the carnivorous *Eurytoma*, and the other the herbivorous *Isosoma*, and thus one species figuratively combines the diminishers of vegetation and the controllers of such diminution. *Isosoma* is destitute of the metallic hue which is the especial ornament of its tribe, but possesses a compact and elegant form, a finely sculptured thorax, and a highly polished abdomen. It occurs in Australia, in Amurland, and probably in all the chief parts of the earth.

PTEROMALUS.—This genus is the last of the Canadian *Chalcidiae*, and thereby indicates what a multitude of discoveries in this tribe are yet to be made in Canada. It inhabits all parts of the earth, and the British species are exceedingly numerous. *P. puparum* is the type of the genus and has been long known in Europe. The chrysalis of a butterfly affords food and lodging for its young; it was found formerly near Hudson's Bay, and its appearance in the U. States has been lately a source of gratification, and it can hardly fail of being shortly recognized in Canada, having now the means of making itself known.

MICRO - LEPIDOPTERA.

BY V. T. CHAMBERS, COVINGTON, KENTUCKY.

Continued from Vol. 5, Page 15.

G. eupatoriella. Ante p. 9. Vol. 4.

The former notice of this species was very brief and imperfect, having, as there stated, been made from a single specimen which had been untimely nipped from its pupa case. Since then I have bred and captured other specimens. It may be *G. Venustella* Clem., *Proc. Acad. Nat. Sci.*, 1860.

p. 92, and re-described by Dr. Clemens, *Proc. Ent. Soc. Phila.*, 1863, p. 216. It does not agree accurately with either of Dr. Clemens' descriptions, but it seems to be a somewhat variable species, though some of the most striking marks in my three specimens are not mentioned by Dr. Clemens. I therefore retain the above name for the present, at least, as Dr. Clemens gives no measurement for his species, and was unacquainted with its food plant. In the following description I have noted the points in which my specimens differ among themselves and from Dr. Clemens' description.

Maxillary palpi and basal joint of the labial palpi dark brown; terminal joint white, with a dark brown annulus before the middle. (In one specimen the labial palpi are entirely white, except the annulus. Dr. Clemens' first description says: "white, with a blackish spot near the middle and one near the tip." His second says: "Second joint fuscous at its end, third with a broad fuscous ring.") Antennae brown; head white; thorax white, narrowly margined near the apex with dark brown, and a dark brown line beginning on the head and extending to the apex of the thorax. (Dr. Clemens does not mention this line nor the dark margins.) Primaries dark grayish brown. A white streak along the dorsal margin from the base to about the middle, where it is confluent with the first dorsal oblique streak. (In one specimen it does not attain the oblique streak. This oblique streak is not mentioned by Clemens, who simply says "the basal portion of the inner margin is white.") A small white dorsal streak at the beginning of the ciliae (not mentioned by Clemens.) A short white costal streak in the basal portion of the wing; another about the middle, extending to or crossing the fold and pointing towards the second dorsal streak. (Dr. Clemens calls this second costal streak a fascia extending obliquely across the wings and sometimes constricted or partially interrupted near the dorsal margin. If sufficiently interrupted, this would make my second dorsal streak.) Two narrow white fasciae in the apical part of the wing, the last one not oblique. (Dr. Clemens calls these costal streaks extended to the middle.) All these streaks are dark margined internally, and the two last named are continued into the dorsal ciliae (a mark not mentioned by Clemens.) A fifth white short costal streak at the apex (not mentioned by Clemens, unless this is what he means by "Ciliae—at the tip of the wings white, touched with black at the ends.") Ciliae of the general hue, with a dark brown hinder marginal line beyond their middle. Anterior legs dark brown, with yel-

lowish-white tarsi; middle pair like the anterior, except that there is a white annulation near the middle of the femora; another at its articulation with the tibiae, and another near the base of the tibiae; posterior legs whitish, annulate with dark brown. (Dr. Clemens says nothing about the markings of the legs and tarsi, but in his classification of his species by the color of the tibiae, he places *Venustella* in the section "without white tibiae.") *Al. ex.* $\frac{1}{4}$ inch.

The larva may be found in the leaves of *Eupatorium ageratoides* from July to October, but is rather rare. The mine is at first a short narrow white line, but ends in a large tentiform mine. It is on the under surface, and the larva frequently leaves one mine to form another. The maxillary palpi are a little larger in this insect than in *Paractopa robiniella* Clem.; and I have not examined the neuration of this species, but I think it is evident at a glance that they are congeneric. And I do not see how, with a species like this before him, Dr. Clemens could have placed *robiniella* in a separate genus. In fresh specimens of *robiniella* the head is not roughened. At p. 7, vol. 4, *ante*, I have suggested that *Paractopa* Clem. is simply Zeller's section of *Gracillaria* with eight marginal veinlets in the primaries. Zeller's section agrees nearly with Herrick-Schaffer's genus, *Euspilapteryx*. And a glance at a figure of *Gracillaria (Euspilapteryx) amogattella*, or *G. (Euspilapteryx) phasianipinella*, as figured by Stainton, *Nat. Hist. Tin.*, or the former in Woods' *Index Entomologicus*, settles the position of *Paractopa* so far as the pattern of coloration can affect it.

Many of the species of this genus, when very young, make linear mines. The mines of *G. plantaginisella* and *G. eupatoriella* are short, crooked lines, ending in the large tentiform blotches heretofore described. That of *G. salicifoliella* is a narrow white line, sometimes nearly straight and with lateral branches on the underside of Willow leaves; when it leaves this mine it again enters the underside, but passes immediately through to the upper surface, where it makes the large blotch mine. The statement at p. 20 *ante*, that it makes but a single mine, is incorrect, as it commonly makes two or three. The young larva is flattened, resembling somewhat a flat *Lithocolletis* larva. *G. purpuriella* sometimes pupates under a web, as stated *ante* p. 28, but usually in its cone. The complete cone sometimes occupies an entire leaf; the apex of the leaf is bent over, so that the left edge touches the right one, to which it is fastened; then the leaf is rolled spirally to the base, and the tip is used to close one end and the base the other, so that the whole leaf is utilized. Many of the

mines, however, are by no means so perfect. Possibly the form of the mine may be useful as indicating the affinities of the species. *G. desmodioliella* Clem. at first makes a narrow linear short mine on the underside of the leaf, ending in a small tent mine, which is indistinguishable from that of *Lithocolletis desmodiella* Clem., in the same leaves; afterwards it leaves the mine and rolls the leaf downwards from the tip. The mines of *G. (Parectopa) robiniella* and *G. (Parectopa) lespedesæoliella* Clem. resemble somewhat the mines of the older larvae of *G. salicifoliella*. The larval habits of the other American species are unknown, except *G. juglandisnigracella*, which makes at first a short linear mine ending in a white blotch on the under surface; at this stage it is indistinguishable from the young mines of some species of *Lithocolletis*; when it leaves the mine it feeds, and then pupates under the edge of the leaf turned up. I have seen no account of the European *G. juglandiella*. The Black Walnut (*Juglans nigra*) is naturalized in Europe. If it is the food plant of *juglandiella*, then *juglandisnigracella* or *blandella* may be the same insect.

ORNIX.

The species of this genus may be distinguished from those of *Gracilaria* by the roughened head, the somewhat broader primaries and the duller colors.

Many of the species resemble each other very closely, so that, as Mr. Stainton says, the specific characters are to be sought for in the ciliae.

"In early life the larvae are leaf miners and make mines on the under surface of leaves, difficult to distinguish from those of the genus *Lithocolletis*. Towards maturity, however, they abandon their mines and feed under a portion of a leaf turned down from its edge, which is bound closely with silk. When they are full fed a small portion of the edge of the leaf is turned over, and the larva weaves its cocoon within the cone thus made."—Clemens' *Proc. Ent. Soc. Phila.*, 1861. p. The italics in this quotation are mine. Mr. Stainton gives substantially the same account of their habits. And I believe the species described below as *O. inusitatumella* is the only known species which has a different habit.

O. inusitatumella. N. sp.?

Dark iron gray, almost brown. Labial palpi whitish, with a dark brownish gray annulus on the third joint before the tip. Head dirty grayish mixed with brown. Antennae gray brown, faintly annulate with

white. Thorax and primaries dark iron gray, or brownish; primaries pale whitish gray along the dorsal margin, dusted with brown. A narrow, brown streak from the fold, which widens into three small spots, once near the base, once towards the middle, and once behind the middle. Seven (or eight?) indistinct pale costal streaks, the first before the middle, the last close to the apex; those in the apical part of the wing are longer than those about the middle, and extend nearly across the wing, and all are internally dark margined. A white spot at the extreme apex, very small, and followed by a minute dark brown dot, behind which is an indistinct brown hinder marginal line. Ciliae of the general hue. *Alar ex.* nearly $\frac{1}{4}$ inch.

At the bottom of p. 116, v. 3, *ante*, I have mentioned a mine on the upper surface of the leaves of Haw trees, which resembles that of *Lithocolletis Virginiella* on the upper surface of Ostrya leaves; and which I then supposed to be the mine of an undescribed *Lithocolletis*. (As will be hereafter explained, there is no such species as *L. Virginiella*, and the supposed mine of that species proved to be the mine of *L. tritenæanella*. (But of that hereafter.) The mine on the upper surface of the Haw leaves proves to be that of the *Ornix* above described. This mine is white, with the frass scattered, and much of it attached to the upper cuticle. It is large and nearly circular, and when completed the leaf is folded upwards. *The larva never leaves the mine, but pupates in it, in a brownish-red cocoon attached to the upper cuticle.* I have never seen it on any leaves except those of *Crataegus tomentosa*, and never on those, except in one small piece of woodland containing about ten acres, near Covington, Kentucky. There they are very abundant, and I have found multitudes of them containing larvae and pupae, and empty ones with the pupa case projecting through the upper cuticle, from May to November. *I have never met with any other Ornix on the leaves of C. tomentosa.* It is a very difficult species to rear, as out of at least one hundred mines that I have gathered containing the larvae and pupae, I have succeeded in rearing but two specimens of the imago.

Dr. Clemens states that his *O. crataegifoliella* has the labial palpi whitish; and does not mention the annulus; and he says that the forewings have a few whitish streaks in the apical part of the wing. His description is scarcely sufficient to enable one to determine a species among those which resemble each other so closely as do many species of this genus. But if he had mentioned the annulus on the palpi, and had

not confined the whitish streaks exclusively to the apical part of the wing, I should have considered *captured* specimens of this species as specimens of his species, which he says also feeds on *C. tomentosa*. But then the habits of his species are those of the genus generally—that is, it leaves the mine and pupates under the turned *down* edge of the leaf.

Nor can there be any suspicion that my first surmise about the mine was correct, viz., that it is a *Lithocolletis* mine, from which I have failed to rear the imago; whilst I have bred an *Ornix*, which was unobserved in another mine on the same leaves. For in one of the instances in which I bred it, I placed, one evening, a single Haw leaf in a wide-mouthed vial, containing nothing else. The leaf was carefully examined, and contained nothing but the mine and pupa of this species. The next morning the *Ornix* had emerged, and its pupa skin was projecting from the mine.

I have, therefore, described it as a new species, notwithstanding its close resemblance to *O. Crataegifoliella*, which Dr. Clemens says feeds upon the same leaves, but which I have never found on or in them.

For the purpose of comparison with the preceding species, and with the one described afterwards (*O. prunivorella*), I here quote Dr. Clemens' description of his species.

O. Crataegifoliella, Clem., *Proc. Ent. Soc. Phila.*, Nov., 1861, (p. 94 of Mr. Stainton's edition.)

"Labial palpi whitish. Head dark brown and gray intermixed. Antennae dark brown, faintly annulate with whitish. Forewings dark brown, with a purplish hue. Along the inner margin, from the base to the anal angle, whitish dusted with dark brownish. In the fold at the base is a dark brown streak, and a small blotch of the same hue beyond the middle, nearly reaching to the inner margin. Toward the tip are a few whitish costal streaks, and at the apex a small round dark brown spot in a whitish patch, with a circular dark brown apical line behind it; ciliae blackish gray. Hind wings blackish gray; ciliae rather paler. Abdomen blackish, tipped with dull yellow."

"The larva mines the leaves of *Crataegus tomentosa* (black thorn) in September, and becomes a pupa early in October, weaving a reddish-brown cocoon in a turned down edge of the leaf. The pupa case is thrust from the end of the cocoon at maturity, the imago appearing early in May. There is doubtless a summer brood, but I have not sought for it. The head of the larva is brown; the body greenish-white, with the dorsum

reddish-brown." This description of the larva suits the larvæ of a great many species.

O. prunivorella. *N. sp.*

Dark steel gray, almost brown. Labial palpi white, each joint tipped externally with dark steel gray. Antennae of the general hue, faintly annulate with whitish. Thorax and primaries dark steel gray, the primaries with about nine faint whitish costal streaks, the first near the base and the last at the apex, becoming gradually longer from the base to the apex, all faintly dark margined internally, the last three or four nearly perpendicular to the costal margin, crossing the wing *and uniting near the dorsal margin*, where they are very narrow and indistinct. A small black apical spot, behind which are three dark hinder marginal lines in the ciliae, the first of which is at their base, and becomes furcate in the dorsal ciliae, the second is at the middle, and the third at the apex of the ciliae. *Al. ex.*, $\frac{1}{3}$ inch. Kentucky.

The larva mines the leaves of Apple trees (*Malus*) and Wild Cherry trees (*Prunus serotina*), making a large tentiform mine on the under surface, which can only be distinguished from that of *Lithocolletis crataegella* Clem., in the same leaves, by its larger size. It is at first a short crooked line, which ends in the large tentiform mine. It leaves the mine to pupate under the edge of the leaf turned down.

Lithocolletis crataegella, *Tischeria malifoliella*, *Aspadisca splendoriferella*, and so many larvae of larger moths feed indifferently on the leaves of *Crataegus*, *Prunus* and *Malus*, that I at first, when I bred this insect from Apple and Wild Cherry leaves, was inclined to suppose it to be *O. crataegifoliella* Clem., but a slight inspection shows it to be different, and I have never found it feeding on *Haw* leaves. Among other things which distinguish it from *O. crataegifoliella* and *O. inusitatumella* the posterior margin of the wings is not whitish, and it has three hinder marginal lines in the ciliae. It may be found in all stages through the summer and fall.

PERSONAL.—We are pleased to learn that Mr. Aug. R. Grote, one of our esteemed contributors, well known for his many valuable papers on Lepidoptera, has removed from Demopolis, Alabama, to Buffalo, N. Y., where he has undertaken active work in connection with the Society of Natural Science.

DESCRIPTIONS OF NORTH AMERICAN HYMENOPTERA, No. 5

BY E. T. CRESSON,

Continued from Vol. 4, Page 231.

Genus MICRODUS, Nees.

MICRODUS IMITATUS. *N. sp.*

♀.—Sanguineous, shining; head, antennæ, prothorax, surroundings of scutellum, pleura beneath, four anterior legs, including their coxæ, posterior trochanters and their tibiæ and tarsi, black; sides of mesothorax tinged with blackish; metathorax coarsely punctured above with four longitudinal carinæ, the two central ones approximate, flanks less coarsely punctured; wings uniformly fuliginous, with the usual hyaline angular streak beneath stigma; abdomen long, narrow, polished, with a purplish reflection; ovipositor longer than body. Length .37 inch.

Massachusetts. More slender than *sanctus*, with the mesothorax, scutellum and sides of pleura sanguineous; the metathorax is differently sculptured and the posterior tibiæ are black.

MICRODUS SIMILIMUS. *N. sp.*

♂ ♀.—Pale sanguineous or fulvo-ferruginous; head, antennæ, the thorax, except metathorax and four anterior legs including coxæ, black; metathorax opaque, scabrous; wings fuliginous; tips of posterior tibiæ and tarsi more or less fuscous; abdomen shining, suture between first and second segments very deeply impressed. Length .22-.27 inch.

New Jersey; Pennsylvania; Illinois. Much smaller than *sanctus*, which it closely resembles, and from which it is at once distinguished by the posterior trochanters not being black.

MICRODUS CALCARATUS. *N. sp.*

♀.—Sanguineous; head, antennæ, the thorax, except metathorax, four anterior legs, posterior trochanters and their tibiæ and tarsi, black; four anterior knees, anterior tarsi except claws, intermediate tarsi except tips of joints, all the tibial spurs and apical joint of posterior tarsi, white or whitish; metathorax shining above, with carinæ forming an elongate central area; wings fuliginous as usual; abdomen shining, second

segment with two finely crenulated, transverse lines ; ovipositor as long as body. Length .25 inch.

Delaware. Allied to *sanctus*, but much smaller, with the tibial spurs and four anterior tarsi white.

MICRODUS DIVISUS. *N. sp.*

♂.—Sanguineous ; head, antennae, pleura, metathorax, post-scutellum, four anterior legs, including coxae, posterior coxae beneath, their trochanters, tips of their femora, their tibiae and tarsi, black ; metathorax roughly scabrous ; wings fuliginous ; abdomen depressed, smooth and polished, a broad, rather deep fovea on each side at base of second segment. Length .34 inch.

Illinois. Differs from *medius*, to which it is closely allied, by the color of the legs ; the metathorax is more roughly sculptured, and the clear blotch beneath the stigma more obscure, while in *medius* it is very conspicuous.

MICRODUS AGILIS. *N. sp.*

♀.—Small, slender, black ; tip of clypeus, labrum, mandibles and palpi yellowish ; thorax shining, metathorax opaque, scabrous ; wings hyaline, faintly dusky, iridescent ; legs pale sanguineous, posterior tibiae yellowish, their tips, a narrow annulus near base, and their tarsi, blackish ; three basal segments of abdomen pale sanguineous, remainder black, shining ; ovipositor as long as body. Length .25 inch.

Massachusetts.

MICRODUS DISCOLOR. *N. sp.*

♂ ♀.—Small, yellow-ferruginous ; antennae entirely black ; space between summit of eyes and two large spots on occiput, fuscous ; most of prothorax, sutures of mesothorax, space around scutellum, sides of pleura and metathorax above, all more or less fuscous ; metathorax transversely rugulose above ; scutellum sometimes blackish, and the spots on occiput sometimes indistinct ; wings pale fuscous, areolet very minute ; legs honey yellow, most of tarsi, tips of four posterior tibiae, tips of posterior femora and an annulus near base of their tibiae, blackish ; abdomen opaque, shining beyond third segment, which is more or less fuscous ; one specimen has the vertex, occiput and thorax entirely, the posterior tibiae except broad median annulus, and the first, apex of the second, and the third

segments of abdomen black. The ♂ varies from entirely ferruginous, except antennae and posterior tibiae, to almost entirely black. Length .14 inch.

Illinois. A very variable species.

MICRODUS PALLENS. *N. sp.*

♀.—Honey-yellow, shining; tips of mandibles and antennae black, scape reddish beneath; metathorax roughened, opaque, pubescent; wings pale fuscous, areolet sub-triangular; intermediate tarsi dusky, tips of posterior tibiae and their tarsi black; abdomen polished. Length .22 inch.

Illinois. Allied to *fulvescens*, Cress., with clear spot beneath stigma much less distinct.

MICRODUS LATICINCTUS. *N. sp.*

♂.—Small, black, shining; mandibles and palpi pale; metathorax scabrous; tegulae pale honey-yellow; wings hyaline, iridescent: stigma blackish; legs honey-yellow, posterior coxae dusky at base beneath, their tibiae yellow, broadly black at tips, their tarsi fuscous; abdomen shining black, first segment longitudinally striated, second yellowish, remainder polished. Length .20 inch.

Missouri. (C. V. Riley.)

MICRODUS CINCTUS. *N. sp.*

♂ ♀.—Small, black, shining; tip of clypeus, mandibles and palpi pale-yellowish; antennae pale testaceous, more or less dusky toward tips, scape piceous; metathorax opaque, finely scabrous; tegulae pale; wings hyaline, iridescent, faintly dusky; legs honey-yellow, tips of posterior femora above black, their tibiae yellow, black at tips, with a narrow black annulus near base, their tarsi fuscous; coxae of ♀ generally entirely black, of ♂ entirely honey-yellow; abdomen black, polished, first segment opaque, second segment pale honey-yellow. Length .17 inch.

Illinois. Smaller than *laticinctus*, from which it is at once distinguished by the first abdominal segment not being striated.

MICRODUS ANNULIPES. *N. sp.*

♀.—Small, black, shining; clypeus, mandibles and palpi more or less pale-yellowish; metathorax rugose, somewhat shining; tegulae honey-yellow; wings hyaline, iridescent, stigma and nervures pale brown; legs

honey-yellow, anterior pair pale, posterior tibiae white, tips and a spot near base black, their tarsi black, white at base; abdomen polished black, second and sometimes base of third segment honey-yellow. Length .16-.18 inch.

Massachusetts; Pennsylvania; Illinois. Easily recognized by the white posterior tibiae annulated with black. It is closely allied to the two preceding species.

MICRODUS EARINOIDES. *N. sp.*

♀.—Small, slender, shining black; mouth pale piceous, palpi whitish; metathorax rugose, sub-opaque; tegulae honey-yellow; wings hyaline, iridescent; legs honey-yellow, posterior tarsi whitish, apex and spot near base black, their tarsi black, whitish at extreme base: abdomen black, depressed, polished, basal sutures of second and third segments sometimes pale. Length .15 inch.

Massachusetts; Illinois. Resembles *Earinus limitaris* in miniature.

Genus EARINUS, Wesm.

EARINUS LIMITARIS.

Bassus limitarsis, Say, Bost. Jour. Nat. Hist., i, p. 250.

♂ ♀.—Black, shining, with a short pale silky pile on face, pleura and metathorax; mesothorax not trilobate, feebly punctured; metathorax rounded, shining, disk with a narrow longitudinal groove; tegulae whitish; wings hyaline, iridescent, costal nerve and stigma black, nervures fuscous, areolet quadrate; legs honey-yellow, posterior tibiae pale, apex broadly and a narrow annulus near base black, their tarsi entirely black; abdomen narrow, depressed, polished, second segment with an oblique groove on each side behind which is a round swelling; sheaths of ovipositor thick, fringed with short dense black pubescence. Length .25-.35 inch.

Canada; Mass.; Penn.; Virginia; Illinois. Common.

CANONS OF SYSTEMATIC NOMENCLATURE FOR THE
HIGHER GROUPS.

BY SAMUEL H. SCUDDER.

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Several years ago, the American Association for the Advancement of Science appointed a committee to reconsider the canons of biological nomenclature, and to report whether, with the growth of science, they required any additions or alterations. No report has yet been made, nor, so far as we are aware, is any likely to be presented, until the subject is again brought prominently forward and new instructions given. Professor A. E. Verrill has since republished * the Revised Rules of Zoological Nomenclature adopted by the British Association for the Advancement of Science in 1865, and has accompanied them by a few apt comments; in England, Mr. W. F. Kirby, in a paper read before the Linnean Society of London, has called attention to the extensive changes which a strict adherence to the laws of priority would cause in the generic nomenclature of butterflies; and quite recently has put the same into practice in his catalogue of these insects.

But hitherto very little has been said concerning the special application of definite rules to groups higher than genera, and it is to this division of the subject that we desire to call attention.

In attempting to legislate upon this branch of zoological nomenclature, two principles must be kept in view: *first*, so far as possible, the canons already in general acceptance for generic nomenclature should be applied to all the monomial groups. Unity of principle lies at the foundation of acceptable legislation; *second*, retrospective laws should be avoided.

One difficulty meets us at the outset,—what some are pleased to term the unstable nature of the higher groups, but which we should prefer to call the disagreement of naturalists as to the limits and value of these groups; yet as this diversity of view is a nearly equal hindrance to any code of rules, it needs only to be mentioned in passing.

Endeavoring to keep in mind the principles above enunciated, and as the simplest means of presenting our views, the following outline of a code is suggested for the consideration of zoologists.

Canons.—1. The name originally given by the founder of a group should be permanently retained, to the exclusion of all subsequent synonyms.

This rule, recognizing the law of priority, which lies at the foundation of all systematic nomenclature, is the same as the first and prime rule of the code accepted by the British Association, with the exception of certain references made exclusively to species; and, since this canon meets universal acceptance, there is no need of discussing it, aside from the following limitations.

1. This law of priority should not extend to works published before 1758.

The same reasons for such a limitation do not exist in the present instance as in the case of specific nomenclature; but similar objections can be made to an earlier limitation. Only three reasonable courses are open to the naturalist: to accept (*a*) no limitation whatever, in which case "our zoological studies would be frittered away amid the refinements of classical learning;" (*b*) the limitation here formulated, in which case all our systematic nomenclature takes its common origin in the tenth edition of Linne's *Systema Naturæ*; * or (*c*) to apply the laws of nomenclature to each kind of group (sub-family, family, class, etc.), from the time when such group was first brought into use—which would engender such confusion as speedily to bring all nomenclature into deserved disrepute.

2. Plural or collective substantives (or adjectives used as substantives) are alone admissible.

As the higher groups are all collective—in idea, if not in fact—it is essential that the names applied to them should be at least capable of a collective sense; and names which are not so formed should be dropped. The retrospective action of such a law, would be very slight.

3. A name which has been previously proposed for some genus or higher group in zoology should be expunged.

This accords too well with accepted rules to require any discussion.

4. When two authors define and name (differently) the same group, both making it of the same or very nearly the same extent, the later name (or if synchronous, the least known name) should be cancelled, and never again brought into use.

* The English—the strongest upholders of the plan of dating from the twelfth edition of the *Systema Naturæ*—are now, by degrees, accepting the earlier date of 1758 as the starting point for zoological nomenclature, and we may assume that, in this view, the whole scientific world will sooner or later concur.

With the exception of certain verbal modifications, this law is identical with the sixth section of the British Association rules, where it is applied to genera only.

5. In any subsequent alterations of the limits of a group, its name should never be cancelled; but should be retained either in a restricted or an enlarged sense.

The necessity for such a limitation is obvious; otherwise a different name would (or, could) be given by every author who differed from preceding ones in his ideas of the precise limitation of any group in question. This indeed has already been done, and, if continued, will create lamentable confusion; but this limitation should itself be subject to one exception, which may be formulated thus:

6. But any assemblage so defined by an author as harshly to violate the groupings of nature (as known to naturalists of his time), should be cancelled.

Such a rule would prevent the injury which might accrue to science by too close an application of the preceding law. The parenthetical limitation seems, however, to be necessary.

II. Changes in the name of one group should not affect the names of other groups.

This follows as a corollary of the first canon, but it has been not infrequently violated, and it is easy to perceive the cause. The nomenclature of higher groups, notably of families and subfamilies, has, to a considerable degree, been founded upon generic names, with the addition of special collective endings to the root (see recommendation 1). Now, when a generic name which has formed the basis of a family designation has been found to be pre-occupied, it has been thought necessary by some to recast the nomenclature of the higher group. But why? After a name has been long applied to a group, it ceases to have any intrinsic meaning and is simply associated with the group itself, recalling it without reference to any particular member of the same. It certainly would be agreeable if we had a nomenclature in which each group should by the very association of ideas recall its members; but since that is utterly impossible, and we have to deal with a mass of synonyms already tangled and intricate, our problem is—how best to make our way out of the difficulty without a continual wrangling over names and entailing endless disputes upon future generations.

To this canon no exception whatever should be made ; for it would be difficult to draw the line anywhere and gain general consent. Anyone who considers the subject, will see that one apparently reasonable exception will lead to another scarcely less desirable, until the whole value and force of the proposed canon is destroyed.

III. The mere enumeration of its members, when known, is a sufficient definition of the limits of a group, and gives it an unquestionable claim to recognition.

Although it is certainly *most* desirable that every name proposed for a group should, when first propounded (or shortly after), be accompanied by a full description of its essential characters, it is evident that no one acquainted with the subject of which an author treats can fail to understand his meaning if he defines his groups by mere enumeration of their members. If, for instance, he designates the known genera to be embraced in a proposed family, he actually defines his group much better than he could do by a specification of its characters, since we have probably not yet been favored with any description of a natural family which gives everything which is characteristic and omits all that is not.

Recommendations.—1. "That assemblages of genera, termed families, should be uniformly named by adding the termination *-idæ* to the name of the earliest known or most typically characterized genus in them ; and that their subdivision, termed subfamilies, should be similarly constructed with the termination *-inæ*."

This recommendation, formulated by the committee of the British Association, is deprived of a great part of its value by the disagreement of naturalists as to the nature of family, and subfamily groups,—assemblages of very diverse natures having received this designation at the hands of different writers ; indeed, up to the issue of Professor Agassiz's Essay on Classification, no one had ever attempted to give definite shape to current opinions upon the subject ; and it will be long before we shall see a general concurrence in either the views put forward in that work, or in any modification of them. Such being the case, it is evident that this recommendation cannot have the force of a law, nor be allowed any retrospective action. Otherwise these rules, or any other reasonable ones (however generally they may be accepted), are powerless to assign to any higher natural group a fixed and unalterable name ; but the group in question would receive a different name from different authors, according as they considered it a subfamily or an assemblage of still another nature.

2. All monomial collective names should be derived from the Greek, and have a plural form.

3. Only the surname of the author who first proposed a group need follow its name, whether the group be used in its original or in a modified sense ; but when it is desirable to indicate at the same time its recognized altered limits, the surname of the writer who first proposed the accepted circumscription may follow in a parenthesis.

In systematic nomenclature, the object is to register titles, not to gratify pride, and the names of authors are appended for convenience, not fame ; the question of justice or injustice has no place here ; and yet the above recommendation ought to be satisfactory to those who view this matter in a different light.

NOTES FROM THE EAST.

PIERIS RAPÆ.—The yellow variety of this butterfly occurs here every summer, from the commencement until the end of the season ; what I have seen of them were of a delicate sulphur yellow. I netted all that I met with, but never found a yellow female on the wing. In July, 1870, I had a pot of mignonette growing on my window-sill, and observed a *white* female *Rapæ* laying eggs on it. I reared seven or eight of the caterpillars, feeding them on mignonette, and they all assumed the pupa state ; after the butterflies had emerged, a friend unfortunately opened the box and some of them escaped before I had seen them. When I examined the box there were five yellow females remaining in it. They had the dark markings very strongly produced, as the later broods generally have ; not knowing at the time the scarceness of the yellow females, I did not preserve them, and I have not seen one since. I believe, with the exception of one reared by Mr. Bowles at Quebec, it is the only instance on record. Last spring I found some chrysalids of *rapæ* containing parasites, but did not succeed in breeding them, as the change from the cold of the open air to the warmth of the house killed them. Last summer *rapæ* was very abundant here, and now the chrysalids may be seen in great numbers suspended to the fences about the city. The parasite has increased wonderfully during last season, for nearly all the chrysalids that I have seen this year are infested with them. I do not think that more than one in fifty has escaped their attacks.—F. B. CAULFIELD, Montreal, P. Q.

MACROBASIS FABRICII.—This beetle was very numerous here last season, and did a considerable amount of damage to the potatoe vines ; in

one field of potatoes that I examined I found on nearly every plant from two to seven of them, busily employed on the leaves; their blue-gray dress contrasted well with the green of the leaves, and gave them quite a picturesque appearance. When disturbed, they did not attempt to fly, but let themselves fall from the leaves; however, when on the ground they were active enough, and soon hid themselves under stones or lumps of earth. While on the plants they appeared to be very peaceable, keeping together in small groups, but on some occasions they are sad cannibals. A friend of mine brought me some of these insects in a paper, and when I opened it there was only one alive; the rest of them were rather badly mutilated, some had lost their legs and some were minus their heads. I put them together again and the survivor immediately commenced a fierce attack on one of his slaughtered relatives, and did not seem one bit the worse after his strange repast.

DIAPHEROMERA FEMORATA.—I found this insect quite common here last summer; they do not seem to be particular in their choice of trees in this locality. I found them on Maple, Linden, Oak and Butternut, and early in the season I found a young one making a tour of discovery on an Elm that I had sugared for moths. I found the males much more active than the females, stalking up the tree when disturbed, while the females either remained quiet or dropped to the ground, rarely going up the tree.—F. B. CAULFIELD, Montreal, P. Q.

HESPERIA ILLINOIS IDENTICAL WITH HESP. ACANOOTUS, SCUDD.

I am informed by the best authorities that under the name of Hesp. "Illinois," I have merely re-described Mr. Scudder's *Hesp. Acanootus*, and I therefore hasten to make the necessary correction.

In comparing my supposed new species with specimens and descriptions of N. A. Hesperidæ, I was misled in regard to *Acanootus*, (which I had never seen,) by Mr. C. S. Minot's description of that species on page 150, vol. iv, of the CANADIAN ENTOMOLOGIST, which will be seen to differ in several important particulars from my description of what now appears to be the same species.

The majority of the females taken here also differ in the spots on the primaries from the female of *Acanootus*, as first described by Mr. Scudder.

The few extenuating circumstances mentioned above, do not, however, relieve me of the blame of having, with injudicious haste, re-described an old established species.—G. M. DODGE, Ohio, Ill.

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